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General and complete disarmament: notification of nuclear tests

Notification of nuclear tests

Note by the Secretary-General

Pursuant to General Assembly resolutions 41/59 N of 3 December 1986 and 42/38 C of 30 November 1987, a communication dated 21 September 1998 has been received from the Permanent Mission of Australia and is reproduced in the annex to the present note.



Annex

Information provided by States

Australia

[Original: English]
[21 September 1998]

With reference to General Assembly resolution 42/38 C. entitled "Notification of nuclear tests", in paragraph 3 of which the Assembly requests States that, while not themselves conducting nuclear explosions, possess data on such events, to make those data available to the Secretary-General for circulation, the Permanent Mission of Australia to the United Nations has the honour to attach details of nuclear explosions detected by Australia from April to June 1998 (appendix I) as well as an explanatory note (appendix II).

Appendix I

Quarterly report on presumed underground nuclear explosions,
April–June 1998

<i>Month (1998)</i>	<i>Day</i>	<i>Universal Time</i>	<i>Locality</i>	<i>Estimated body-wave magnitude^a</i>	<i>Estimated yield kilotons^b</i>	<i>Sequence number</i>
April	Nil					
May	11	10 13	India ^c	5.2	10-40	98/1
May	13	06 45	India ^d	—	—	98/2
May	28	10 16	Pakistan ^c	4.8	<10	98/3
May	30	06 55	Pakistan	4.7	<10	98/4
June	Nil					

Source: Australian Geological Survey Organization, Seismological Centre. Information in this bulletin was derived from Australian seismological facilities and from institutions in other countries in the monitoring of earthquakes and nuclear explosions.

^a Unless otherwise noted, the estimated body-wave magnitude is that published by the United States National Earthquake Information Center and is based on observations of magnitude obtained from around the world, including from Australia.

^b The yields are estimated using empirical equations, but there is no single agreed formula for the determination of yields. The yields estimated from these relations are not sufficiently accurate to determine compliance with international treaties.

^c The Government of India announced it had detonated three nuclear explosions on 11 May while the Government of Pakistan announced it had detonated five nuclear explosions on 28 May. For these two cases only one seismic signal was recorded on Australian seismic stations, indicating that all explosions were detonated simultaneously or that only one was large enough to be recorded.

^d The Government of India announced it had detonated two subkiloton explosions on 13 May. No signals from these events have been found in the records produced by Australian seismic stations.

Appendix II

Explanatory note

1. When a nuclear device is detonated underground, seismic waves radiate out in all directions. In order to establish that an underground nuclear explosion has taken place, pinpoint its location and estimate the size or yield of the blast, seismologists attempt to detect and analyse the several distinct types of seismic waves generated by the blast. Many factors affect the strength and clarity of these seismic waves, particularly the efficiency with which the explosion transmits energy to the surrounding earth. This efficiency is, in turn, dependent on local geological conditions such as the hardness and water content of the rock surrounding the explosion. Knowledge of the path through the earth which the seismic signals have travelled is also important.
 2. An international network of seismic stations would add significantly to confidence in the ability to detect and locate the source of underground nuclear explosions, whenever conducted. Australia is actively engaged in the international effort to create such a network and, in addition, has established a number of bilateral links for seismic cooperation.
 3. Experts estimate that confidence in an international seismic network would extend to coupled explosions with yields down to about 5 kilotonnes and possibly as low as 1 kilotonne: beyond that, distinguishing nuclear explosions from earthquakes and other seismic "noise" becomes a more difficult task, and supplementary measures may be necessary. Estimating the yield of an underground explosion by remote seismic means is especially difficult given the data currently available. The relationship between seismic signals and yield is not fixed but subject to the vagaries of geology and a number of other unknown factors. At the present time we do not have openly available the large and authoritative database of explosions of known yield in various locations and geological conditions necessary to define the relationship with maximum confidence. That is why the footnotes to the table in appendix I of the present report stress that the estimated yields are not sufficiently reliable to determine compliance with international treaties. All those questions are being actively addressed in international forums.
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